



Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

January 11, 2010

Carmen Nieves
G&C Ambientpetrol V, Inc.
4715 Warrington Drive
Orlando, Florida 32826

Re: **BROS-PLUS**

Dear Ms. Nieves:

The Bureau of Petroleum Storage Systems (the Bureau) hereby accepts BROS-PLUS, a formulation of nutrients and non-pathogenic bacteria for the bioremediation of petroleum contaminants in groundwater and soil, in situ and ex situ. Enclosure 1 is a voucher for the confidential disclosure of a proprietary chemical analysis to the Bureau.

The Bureau of Petroleum Storage Systems does not provide endorsement of specific or brand name remediation products or processes. It does, however, recognize the need to determine their acceptability in the context of environmental regulations, safety and the protection of public health. For that reason, the Bureau issues an "acceptance" letter, not an approval. Such acceptance shall not be construed as a certification of performance, nor shall it be construed as approval for uses that are beyond the Bureau's jurisdiction, which is the cleanup of petroleum pursuant to Chapter 62-770, Florida Administrative Code (F.A.C.). Additionally, vendors, upon receipt of an acceptance, must market their product or process on its own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace.

Remedial Action Plans that propose the use of an accepted product or process should include a copy of the acceptance letter in the plan's appendix, and reference it in the text of the document. It is not a requirement that a particular remediation product or process have an official acceptance letter in order for it to be proposed in a site-specific Remedial Action Plan. The plan, however, must contain sufficient information about the product or process to show that it meets all applicable rules and regulations.

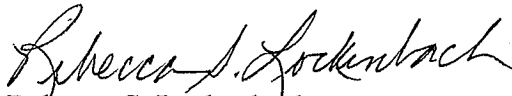
The Bureau reserves the right to revoke its acceptance of a product or process if it has been falsely represented. Additionally, Bureau acceptance of any product or process does not imply it has been deemed applicable for all cleanup situations, or that it is preferred over other treatment or cleanup techniques in any particular case. A site-specific evaluation of applicability and cost-effectiveness must be considered for any product or process, whether conventional or

innovative, and adequate site-specific design details must be provided in a Remedial Action Plan submitted for Department review and approval. Enclosure 2 contains regulatory information that is applicable to BROS-PLUS; Enclosure 3 contains supplemental information; and Enclosure 4 is an Underground Injection Control Notification. Please contact Rick Ruscito at (850) 877-1133, extension 3722, if there are any questions.

Sincerely,



Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6



Rebecca S. Lockenbach
FDEP Section Leader
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

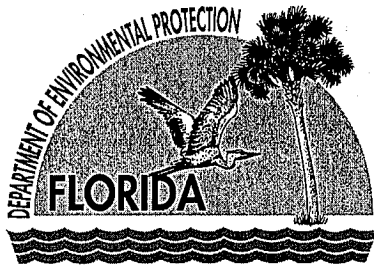
- enc: (1) Proprietary Chemical Analysis Voucher
- (2) Regulatory Information
- (3) Supplemental Information
- (4) Underground Injection Control Notification

c: T. Conrardy - FDEP/Tallahassee

History

INN_170 1/11/10
PPL 393

PROPRIETARY CHEMICAL ANALYSIS VOUCHER



Florida Department of
Environmental Protection

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January 11, 2010

Carmen Nieves
G&C Ambientpetrol V, Inc.
4715 Warrington Drive
Orlando, Florida 32826

Re: **Proprietary Chemical Analysis Voucher**

Dear Ms. Nieves:

The Bureau of Petroleum Storage Systems (the Bureau) hereby acknowledges receipt of a confidential disclosure dated January 5, 2010 containing the results of a chemical analysis of BROS-PLUS, a proprietary formulation of nutrients and non-pathogenic bacteria for the bioremediation of petroleum contaminants in groundwater and soil.

Having reviewed the confidential disclosure, the Bureau hereby vouches for its content, and provides advice in Enclosure 2 on how to comply with applicable regulations of the Florida Administrative Code (F.A.C.) when BROS-PLUS is used for the cleanup of petroleum pursuant to Chapter 62-770, F.A.C. The Bureau, in offering its advice, has been careful to mention only the ionic species in BROS-PLUS that must be monitored by users in order to comply with regulations, but not so much as to compromise their proprietary concentrations, or to disclose the identity of any other ions present that are not of regulatory concern.

For underground injection control purposes, injection-type aquifer remediation plans must specify both the volume and the complete chemical composition of the fluid to be injected. But since the details of the chemical constituents and their proportions in BROS-PLUS are proprietary, it will suffice to indicate just the volume of BROS-PLUS fluid that will be injected, and then indicate that a confidential disclosure of the proprietary details has already been submitted to the Department and accepted. Reference should be made to this voucher, and a copy of it should be included as an appendix to the plan.

Reviewers of Remedial Action Plan's proposing the use of BROS-PLUS for the cleanup of petroleum-contaminated sites may contact Rick Ruscito at (850) 877-1133, extension 3722.

Sincerely,

Rick Ruscito

Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

Rebecca S. Lockenbach

Rebecca S. Lockenbach
FDEP Section Leader
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

REGULATORY INFORMATION

Since biological remediation products like BROS-PLUS are most often applied by injection, and the bulk of the regulatory concern in regard to such products is often in regard to injection, the advice offered below is focused on that subject.

- a. Rules: G&C Ambientpetrol V Incorporated and users of BROS-PLUS shall comply with all applicable regulations. This includes meeting applicable groundwater cleanup target levels during the timeframe of a cleanup project for the contaminants of concern, the residual concentrations of BROS-PLUS ingredients, and any byproducts of concern produced by chemical and biological reactions induced by those ingredients.

Chapters of the Florida Administrative Code (F.A.C.) that may be applicable, either in part or in their entirety, include but are not necessarily limited to Chapter 62-520, F.A.C., for groundwater classes and standards; Chapter 62-522, F.A.C., for groundwater permitting and monitoring requirements; Chapter 62-528, F.A.C., for underground injection control, particularly Part V, for Class V, Group 4 aquifer remediation projects; Chapter 62-550, F.A.C., for primary and secondary drinking water quality standards; Chapter 62-770, F.A.C., for petroleum cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.

- b. Pilot study: For petroleum cleanup, pursuant to Rule 62-770.700(2), F.A.C., it is required that a pilot study proposal be submitted for review, and that a pilot test be performed prior to the design of a full-scale treatment system. If conditions at a site do not warrant a pilot study, then a proposal explaining the rationale to forego it must be submitted for review.
- c. Underground Injection Control permit: Per Rule 62-528.630(2)(c), F.A.C., Class V injection-type aquifer remediation wells are exempt from the permitting requirements of Rule 62-528.635, F.A.C., when authorized by a Department-approved Remedial Action Plan or other enforceable mechanism, provided the requirements of the rules governing the remediation project, as well as the construction, operation, and monitoring requirements of Chapter 62-528, F.A.C., are met. Per Rule 62-528.630(2)(c), F.A.C., the issuance of an enforceable, site-specific Remedial Action Plan Approval Order by the Department for injection-type aquifer remediation constitutes the granting of a Class V injection well construction/clearance permit.
- d. Underground Injection Control notification: Remedial Action Plans proposing in situ, injection-type aquifer remediation shall include information pursuant to Rules 62-528.630(2)(c)1 through 6, F.A.C., for the inventory purposes of the Underground Injection Control program. Reviewers of those plans, upon issuance of an enforceable Remedial Action Plan Approval Order by the Department, must submit this inventory information to the Underground Injection Control Section by using the notification memorandum in Enclosure 4.
- e. Temporary injection zone of discharge (ZOD): It will be necessary to seek permission, via Rule 62-522.300(2)(c), F.A.C., for a temporary ZOD for the injection of BROS-PLUS, since its chemical composition, as indicated by Ambientpetrol V Incorporated in its

January 5, 2010 confidential disclosure, does not meet the injection criteria for ammonia and total dissolved solids.

In order to obtain ZOD permission, each site-specific Remedial Action Plan proposing the use of BROS-PLUS must: (a) indicate that the concentrations of ammonia and total dissolved solids in the fluid to be injected will be in excess of their groundwater standards; (b) specify a temporary injection zone size; (c) specify the period of time for which the temporary zone will be needed; and (d) propose groundwater monitoring of the ZOD parameters in accordance with the table above. In most cases, monitoring on a quarterly basis should be sufficient. The number of monitoring wells to be sampled will depend on the size of the area treated, but for most applications, a minimum of two (2) wells should suffice: one in the center of the treatment area, the other near the downgradient edge. Zone size for a single injection point, in most cases, is likely to be the same as the point's injection radius of influence. And for a cluster of injection points, the overall zone size can be defined as the agglomeration of all its individual points.

The current groundwater standards for the BROS-PLUS zone of discharge parameters are 2.8 milligrams per liter (mg/L) for ammonia, and 500 mg/L for total dissolved solids. Upon expiration of the time requested for the ZOD, the concentration of those two parameters must meet their respective groundwater standards, or their natural-occurring background values at the site, whichever is less stringent.

Department issuance of an enforceable, site-specific Remedial Action Plan Approval Order for a Remedial Action Plan that meets the requirements of Rule 62-522.300(2)(c), F.A.C., constitutes the granting of permission for the temporary injection zone of discharge.

- f. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Bureau of Petroleum Storage Systems has no objection to the use of some wells for the application of BROS-PLUS. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply BROS-PLUS. This will avoid premature conclusions that the entire site meets cleanup goals. By making sure that designated tracking wells are not also used for treatment, there will be more assurance that the treatment process has permeated the entire site and that it did not remain localized to the area immediately surrounding each injection well.
- g. Avoidance of migration: Pursuant to Rule 62-528.630(3), F.A.C., for in situ injection-type aquifer remediation projects, injection of remediation fluids such as BROS-PLUS shall be performed in such a way, and at such a rate and volume, that no undesirable migration of either the product's ingredients or the contaminants of concern in the aquifer results.
- h. Abandonment of wells: Upon issuance of a petroleum Site Rehabilitation Completion Order, or a declaration of "No Further Action", injection wells shall be abandoned pursuant to Section 62-528.645, F.A.C. The Underground Injection Control Section of the Department shall be notified so that the injection wells can be removed from the inventory-tracking list.

- i. Open-pit application: Open-pit application is not an injection, and notification of the Underground Injection Control Section is not required, but the user of BROS-PLUS must still be mindful of groundwater quality. Therefore, for open-pit application, the Bureau suggests that groundwater in the application area be monitored for the same parameters that would have required zone of discharge monitoring, had the application actually been an injection.
- j. Phosphate: This element is present in BROS-PLUS. It is essential for life, and occurs naturally in Florida's groundwater. It is not regulated as a groundwater contaminant, but it is regulated as a surface water contaminant. At a Panama City, Florida site, total phosphorus in the groundwater was measured at 800 to 1,100 micrograms per liter (ug/L). At a Volusia County site in Florida, it was measured at 1,200 ug/L, as PO_4 . For comparison purposes, the European Community Guide level for phosphorus in drinking water is 400 ug/L, as P_2O_5 . While phosphorus may not be a matter of great toxicological concern for in situ injection-type groundwater remediation projects, the Bureau of Petroleum Storage Systems would like to remind users of the BROS-PLUS that it could become an environmental concern if a surface water body is very close to the treatment area of a remediation site. In such a case, if there is a potential for interaction between the groundwater being treated and the nearby surface water body, then the state's surface water regulations should be reviewed first for requirements regarding phosphorus.

SUPPLEMENTAL INFORMATION

- a. Application rate: G&C Ambientpetrol V Incorporated has indicated that a typical volumetric application rate for BROS-PLUS is 1 liter per cubic meter of contaminated media to be remediated. The Bureau of Petroleum Storage Systems would like to add that a volumetric application rate either greater or less than 1 liter per cubic meter will not trigger a need for zone of discharge permission for any other parameters beyond the ammonia and total dissolved solids that already require such permission, nor will an increase in the concentration of any of the chemical species present, as reported in the January 5, 2010 confidential disclosure of a proprietary chemical analysis, trigger a need for zone of discharge permission for any other parameters beyond ammonia and total dissolved solids.

Florida Department of
Memorandum Environmental Protection

TO: Cathy McCarty, P.G.
Bureau of Water Facilities Regulation
Underground Injection Control Section – MS 3530

FROM: _____

DATE: _____

SUBJECT: **Proposed Injection Well(s) for In Situ Aquifer
Remediation at a Petroleum Remedial Action Site**

Pursuant to paragraph 62-528.630(2)(c), F.A.C., inventory information is hereby provided regarding the proposed construction of temporary injection well(s) for the purpose of in situ aquifer remediation at a petroleum-contaminated site.

Facility name: _____

Facility address: _____

City/County: _____

Latitude/Longitude: _____

FDEP Facility Number: _____

Facility owner's name: _____

Facility owner's address: _____

Well contractor's name: _____

Well contractor's address: _____

AFFECTED AQUIFER

Name of aquifer: _____
Depth to groundwater (feet): _____
Aquifer thickness (feet): _____
Areal extent of contamination (square feet): _____

INJECTION WELLS

A site map showing the location and spacing of injection wells, the areal extent of the groundwater contamination plume, and associated monitoring wells is attached. The injection well(s) features are summarized below, and/or a schematic of the injection well(s) is attached.

Direct-push or HSA/Mud rotary (*circle the appropriate well type*)
Diameter of well(s) (i.e., riser pipe & screen) (inches): _____
Total depth of well(s) (feet): _____
Screened interval: _____ to _____ feet below land surface
Grouted interval: _____ to _____ feet below land surface
Casing diameter, if applicable (inches): _____
Cased depth, if applicable: _____ to _____ feet below land surface
Casing material, if applicable: _____

PROJECT DESCRIPTION

The in situ, injection-type aquifer remediation product/process remediates petroleum by:
(check those that apply)

- ☐ bioremediation,
☐ chemical oxidation, or
☐ other (describe) _____

Brief description of the project: _____

Summary of major design considerations and features of the project:

Number of injection wells: _____
Injection volume per well (gallons): _____
Single or multiple injection events: _____
Injection volume total (all wells, all events): _____

FLUID TO BE INJECTED

Composition of injected fluid (ingredient, wt. %): _____

TEMPORARY INJECTION ZONE OF DISCHARGE (ZOD)

(check those that apply)

- ☐ No ZOD needed. The fluid to be injected meets the primary and secondary drinking water standards set forth in Chapter 62-550, F.A.C., and the minimum groundwater quality criteria set forth in Chapters 62-520 and 62-777, F.A.C.
- ☐ ZOD permission by paragraph 62-522.300(2)(c), F.A.C., for reagent chemical species and/or parameter(s) in the fluid to be injected (or re-injected) that exceed secondary groundwater standards. ZOD permission by this paragraph also applies to chemical species in the fluid to be injected that exceed primary groundwater standards or minimum groundwater criteria, provided those species are prime constituents of the reagents used to remediate site contaminants. The list of chemical species and parameters for which the approved remediation plan identifies zone size, duration and groundwater monitoring are as follows:

- ☐ ZOD permission by paragraph 62-522.300(2)(c), F.A.C., for the following petroleum products' contaminants of concern that exceed their groundwater standards in the fluid to be re-injected as part of a closed-loop re-injection system for which the approved remediation plan identifies zone size, duration and groundwater monitoring:

- ☐ ZOD permission by variance because the fluid to be injected contains the following impurities that are not prime constituents of the reagents used to remediate the site's contaminants, and the concentrations of those impurities in the fluid to be injected are in excess of their primary groundwater standards:

- ☐ A variance needs to be granted before the remediation can be conducted.

- ☐ A variance has already been granted for the impurities listed above:

Date variance granted: _____

Zone size (square feet): _____

Duration (months): _____

- ☐ If ZOD permission by paragraph 62-522.300(2)(c), F.A.C., or by variance is checked above, then a figure that delineates the ZOD is attached, or

- ☐ The ZOD is described as follows: _____

Cathy McCarty, P.G.
Page 4 of 4
Date: _____

Facility name: _____
FDEP facility no.: _____

CLEANUP CRITERIA AND ENFORCEABLE APPROVAL ORDER

The in situ injection-type aquifer remediation plan for this petroleum contaminated site is intended to meet the groundwater petroleum cleanup criteria referenced in Chapter 62-770, F.A.C. Additionally, all other groundwater standards will be met at the time of project completion for any residuals associated with the ingredients of the injected remediation products, and any by-products or intermediates produced as a result of the chemical or biochemical transformation of those ingredients or the contaminating petroleum product during their use. Applicable primary and secondary drinking water standards are set forth in Chapter 62-550, F.A.C., and additional groundwater quality criteria are set forth in Chapters 62-520 and 62-777, F.A.C.

The remediation plan estimates that site remediation will take _____ months. We will notify you if there are any modifications to the remediation strategy which will affect the injection well design or the chemical composition and volume of the injected remediation product(s).

The proposed remediation plan was approved on _____ by an enforceable approval order. A copy is attached. The remediation system installation is expected to commence within 60 days. Please call me at _____ if you require additional information.